

CLAIMS

What is claimed is:

1. A method of providing dynamic power redundancy for a system, the
5 method comprising:
tracking a number of power supply units, n , that are presently in an up
state;
determining dynamically a number of power supply units, N , that are
presently needed to supply power to the system; and
10 generating an action alert to increase a margin of safety corresponding to
a difference between n and N if the margin of safety reaches a
minimum acceptable level.
2. The method of claim 1, further comprising:
15 measuring an actual electrical current used while the system is online to
generate an analog current measurement signal;
converting the current measurement signal to digital current measurement
data; and
utilizing the current measurement data in the dynamic determination of N .
20
3. The method of claim 2, wherein N is calculated by dividing a measure of
current drawn by the system over a specified period of time by a
maximum current per power supply and rounding up.
- 25 4. The method of claim 3, wherein the measure of current drawn by the
system comprises a peak current drawn by the system.
5. The method of claim 1, wherein the tracking of n is performed using
supply state tracking registers coupled to the power supply units.
30
6. The method of claim 1, wherein the minimum acceptable level for the
margin of safety comprises zero units.

7. The method of claim 1, wherein the minimum acceptable level for the margin of safety comprises more than zero units.
- 5 8. The method of claim 1, wherein the action taken comprises hot swapping of a failed component.
9. The method of claim 1, wherein the action taken comprises cold swapping of a failed component.
- 10 10. The method of claim 1, further comprising:
determining an initial value of N at design time based on expected power needs of the system.
11. The method of claim 10, further comprising:
15 configuring the system with an initial margin of safety.
12. An apparatus for providing power redundantly to a system, the apparatus comprising:
a plurality of power supply units configured to provide power to the
20 system;
at least one current sensor for measuring an electrical current drawn by the system;
a power-consumption tracking unit coupled to the at least one current
sensor; and
25 supply state tracking registers coupled to the power supply units and configured to hold a state variable for each said supply unit.
13. The apparatus of claim 12, wherein the supply state tracking registers are
30 utilized in tracking a number of power supply units, n, that are presently in an up state.

14. The apparatus of claim 13, wherein the power-consumption tracking unit is utilized in determining dynamically a number of power supply units, N , that are presently needed to supply power to the system.
- 5 15. The apparatus of claim 14, wherein if a margin of safety corresponding to a difference between n and N reaches a minimum acceptable level, then an alert is generated to take intervening action to increase the margin of safety.
- 10 16. The apparatus of claim 12, further comprising:
an output bus bar is coupled to multiple power supply units.
17. The apparatus of claim 16, wherein the current sensor comprises a device coupled to the output bus bar.
- 15 18. The apparatus of claim 17, wherein the device comprises an in-line current measuring device.
19. The apparatus of claim 17, wherein the device comprises a passive
20 current measuring device.
20. The apparatus of claim 12, wherein current sensors are integrated with the power supply units.
- 25 21. A power subsystem for providing dynamic power redundantly to system hardware, the power subsystem comprising:
means for tracking a number of power supply units, n , that are presently
in an up state;
means for determining dynamically a number of power supply units, N ,
30 that are presently needed to supply power to the system hardware;
and

logic circuitry for generating an action alert to increase a margin of safety corresponding to a difference between n and N if the margin of safety reaches a minimum acceptable level.